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(54) Object coated with carbon film and method of manufacturing the same

(57) An object such as an automobile part, an image forming apparatus part, a bicycle part, other machine parts, a sport article or its part, a toy or its part, or a rain article or its part has a portion to be in contact with a contact object. The contact portion is made of at least one kind of material selected from a group including polymer material such as resin or rubber as well as glass, and the contact portion has a surface entirely or partially coated with a carbon film (typically, a DLC film) having a wear resistance as well as at least one of a lubricity, a water repellency and a gas barrier property. The carbon film is formed on the object with a good adhesion.

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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
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A	* page 25, line 38 - page 26, line 58 *	22-27	C23C16/26
X	IQBAL S ATHWAL ET AL: "DLC FILMS BY PLASMA ASSISTED CHEMICAL VAPOR DEPOSITION NEAR ROOM TEMPERATURE" DIAMOND AND RELATED MATERIALS, NL, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, vol. 2, no. 12, 1 November 1993 (1993-11-01), pages 1483-1489, XP000413556 ISSN: 0925-9635 * the whole document *	1,2,16, 21	C23C16/02
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A	DATABASE WPI Section Ch, Week 199213 Derwent Publications Ltd., London, GB; Class E36, AN 1992-180016 XP002134052 & JP 04 041672 A (TDK CORP), 12 February 1992 (1992-02-12) * abstract *	16,21,22	C23C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		28 March 2000	PATTERSON, A
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-anthien disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after, the date of filing of the application D : document cited in the application L : document cited for other reasons B : member of the same patent family, corresponding document			

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-3, 6, 13, 16, 21-30



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-3 6 13 16 21-30

Glass or polymer article, in particular a machine part, with carbon coating having another property in addition to wear resistance. First method for making such an article using one of three vapour phase coating techniques.

2. Claim : 4

A structural component having a carbon film on its surface.

3. Claim : 5

Toy or part thereof having a carbon film on its surface.

4. Claim : 7

Pipe having a carbon film on its surface.

5. Claim : 8

Bicycle part having a carbon film on its surface.

6. Claim : 9

Sheet having a carbon film on its surface.

7. Claim : 10

Sport article having a carbon film on its surface.

8. Claim : 11 12

Tyre having a carbon film on its surface.

9. Claim : 14

Rain article having a carbon film on its surface.

10. Claim : 15

Diaphragm of diaphragm pump having a carbon film on its surface.



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

11. Claim : 17

Method for manufacturing an object coated with a carbon film having other properties beside wear resistance. Method characterized by a certain pretreatment step

12. Claim : 18 19

Method for manufacturing an object coated with a carbon film having other properties beside wear resistance. Method characterized by another, unrelated pretreatment step

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 97 11 0508

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82